

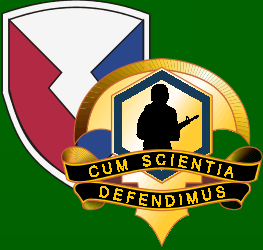


Reserve Component Food Service Training Workshop 12-16 March 2001



**Fueling the Warrior
of the 21st Century**

**Gerald A. Darsch
Joint Project Director
DoD Combat Feeding Program (CFP)
U.S. Army Soldier & Biological Chemical Command
Gerald.Darsch@natick.army.mil**



The DoD Combat Feeding Program

Joint Service Program Supporting DoD & Military Needs for Research, Development, Test, Evaluation, and Engineering for:

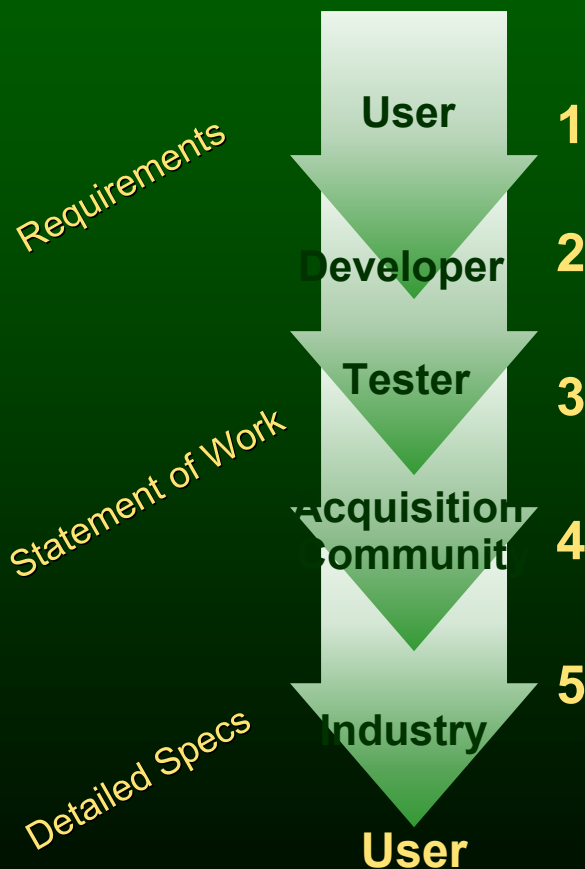


- ◆ **Combat Rations**
- ◆ **Field Food Service Equipment**
- ◆ **Combat Feeding Systems**

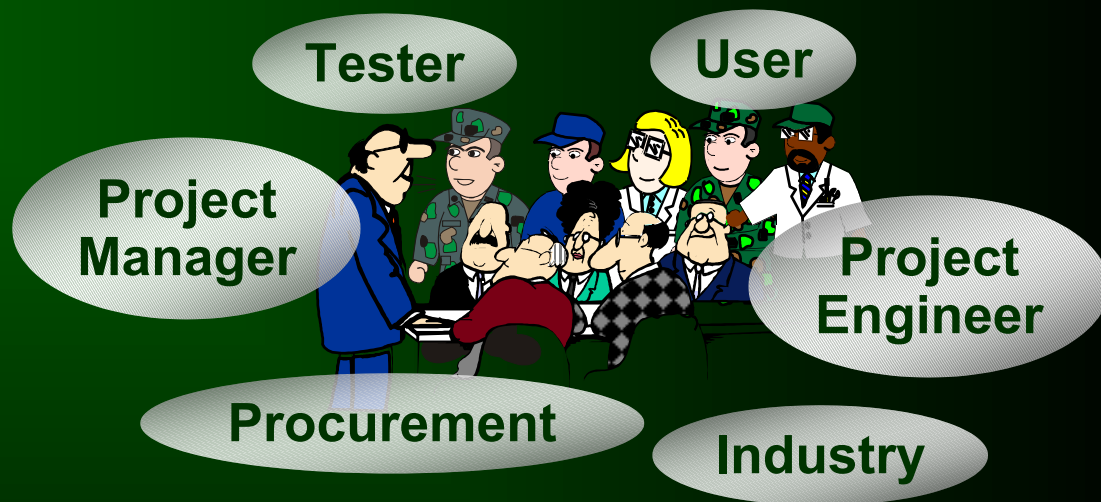


Integrated Product Team

..then



now...

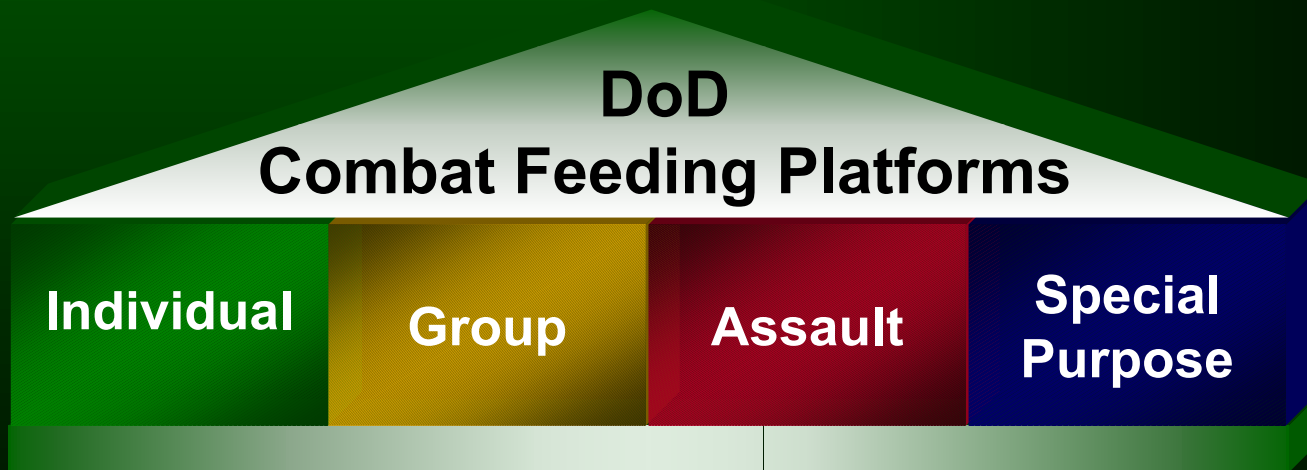


- ◆ Multi-Disciplinary Teams
- ◆ Early Industry Involvement
- ◆ Risk Identification, Tradeoffs, Alternatives
- ◆ Field Testing (OFIG)
- ◆ Accelerated Acquisition Strategies



Program Integration

- ◆ **Basic and Applied Research**
- ◆ **Technology Demonstration**
- ◆ **Development and Engineering**





Ration Development Constraints

- ◆ Acceptance
- ◆ Nutrition
- ◆ Wholesomeness
- ◆ Producibility
- ◆ Cost
- ◆ Sanitation



- ◆ World Wide Environments
- ◆ Performance Enhancement
- ◆ Universal Acceptance
- ◆ Self-Heating
- ◆ Modularity
- ◆ Air Delivery
- ◆ Weight/Cube
- ◆ Shelf Life
- ◆ Boredom
- ◆ NBC Threats





Meal, Ready-to-Eat (MRE)

- ◆ **24 Menus**
- ◆ **Over 90 New Items**
- ◆ **Vegetarian Meals**
- ◆ **Customer Driven**



“Warrior Recommended, Selected, Tested, & Approved”



-
- A diagram illustrating the merging of two paths. Two yellow curved arrows, one labeled 'LRP' on the left and one labeled 'RCW' on the right, point downwards towards a single yellow arrow pointing downwards. This represents the merging of the LRP and RCW paths into a single path.





UGR H&S

- ◆ Increased Serving Size of Vegetables
- ◆ Breakfast Menus From 5 to 7
- ◆ Dinner Menus from 10 to 14
- ◆ Polymeric Tray Approved
- ◆ Align Menus With H&S Option





Field Test 2000 - Oct 2000 Ft. Drum, NY

- ◆ **Assess current rations**
- ◆ **Evaluate potential new ration items**
- ◆ **Measure waste/overages**



**UGR H&S
BFKT/Dinner
MRE
Lunch**

**7 days
3 companies/450 soldiers
(2) - current/latest rations
(1) - test items**

**Body Weight
Questionnaires :
Background
Post-Test**



Field Test 2000 - Test items

MRE XXVIII

**Chicken Breast w/Oriental Vegetables
Pot Roast With Vegetables
Pepperoni Pocket Sandwich
Boneless BBQ Pork Rib
Vegetable Lasagna
Spanish Omelet
Dirty Rice
Tuna Salad
Manicotti

Pumpkin Cake
Chocolate Mint Cookie
Almond Poppyseed Cake
Crispie/Peanut Butter M&Ms
New England Clam Chowder
Zapplesauce (CHO Fortified)**



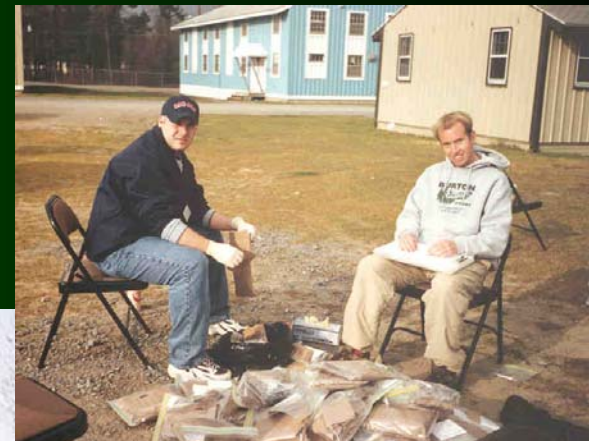
UGR H&S

**Peanut Butter Choc Chip Cookies
Spinach & Cheese Estrada
Waffle/Sausage Sandwich
Pancakes (2 Types)
Breakfast Squares
Chocolate Waffles
3 Types Eggs
Scones

Pasta w/ Beans
Shepherd's Pie
Blonde Brownies
Captain's Chicken
Cherry Nut Loaves
Portabella L'Orange
Turkey Sausage Links
Curried Chicken & Rice
Grilled Vegetable Lasagna**



Field Test 2000



- ◆ Food/Packaging Waste
- ◆ All MRE Trash Turned In
- ◆ Each Soldier Issued a Trash Bag
- ◆ Verify MRE Diet Records
- ◆ Address STO/DTO Metrics





MBU

- ◆ Replacement for the M2 Gasoline Burner
- ◆ Reduced Logistical Burden
- ◆ JP-8 Fuel
- ◆ Increased Safety
- ◆ Electronic Ignition/Controls





KCLFF-E

- ◆ Feeds up to 200 Soldiers per Day
- ◆ UGR H&S Ration/Limited Cook-Prepared Rations
- ◆ Hot Meals to Remote Sites
- ◆ Upgraded Equipment Including M-59 Range Cabinet





MKT -I

- ◆ Upgraded MKT
- ◆ Fluorescent Lighting
- ◆ 110 VAC
- ◆ Exhaust Circulation Fan
- ◆ Vinyl Coated Polyester Walls/
- ◆ Cold Weather Ground Skirt
- ◆ Additional Equipment





Containerized Kitchen

- ◆ Feeds up to 550 per Day
- ◆ UGR- A or UGR H&S
- ◆ Expandable 8x8x20 ISO
- ◆ Trailer Mounted, Towable
- ◆ Set-up Time - 5 Soldiers/ 30 Minutes
- ◆ 10kW Generator



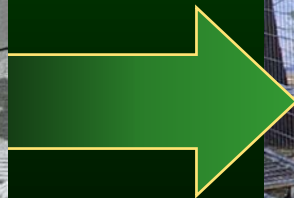


Food Sanitation System

- ◆ Increased Safety
- ◆ Reduced Water Usage/Gray Water Generation
- ◆ One Burner
- ◆ Automated Pretreatment of Gray Water
- ◆ Reduced Procurement/O&S Costs



**Immersion
Heaters**



Current Prototype

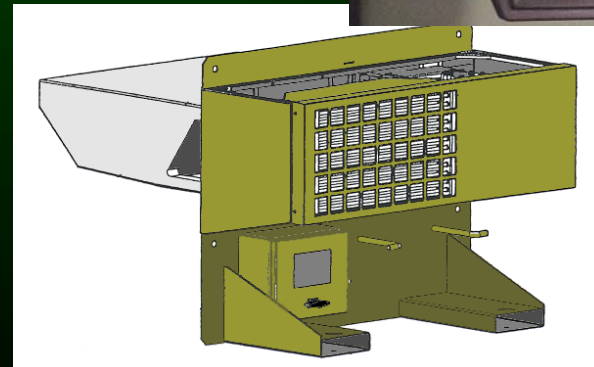
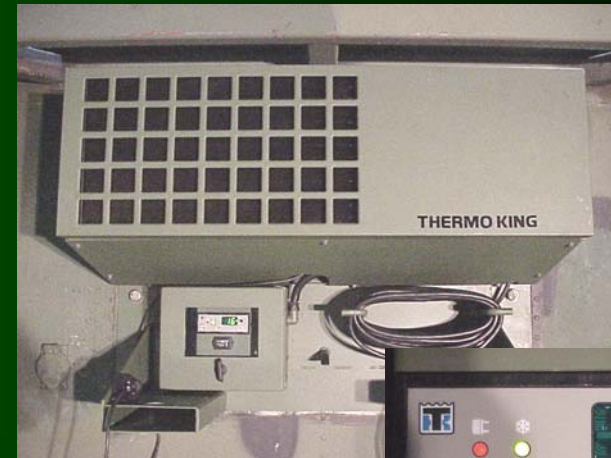




Field Refrigeration

4,500 BTU/HR Vapor Compression Environmental Refrigeration Unit

- ◆ One Piece All Electric Unit
- ◆ Non Ozone
- ◆ 544 Units Fielded
- ◆ Interfaces with Current & Future 8x8x10 ISO Container





Quotable Quotes



"The Combat Feeding Program continues to provide super rations for our great soldiers."



GEN John W. Hendrix
CG, FORSCOM
Sep 2000



Joint Vision 2020



**Dominant
Maneuver**

**Precision
Engagement**

**Full
Dimensional
Protection**

**Focused
Logistics**

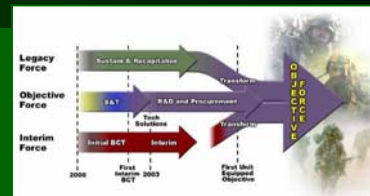
FULL SPECTRUM DOMINANCE

www.dtic.mil/jv2020



Service Visions

◆ Army Transformation: The Objective Force



◆ MC Strategy 21



◆ Forward From The Sea



◆ Air Force 2025





Supporting the Army Vision



- ◆ ***Greater Fuel Efficiencies***
- ◆ ***Responsive***
- ◆ ***Reduced Footprint***
- ◆ ***Reduced Replenishment Demands***
- ◆ ***Revolutionary Sustainment***

"It is our intent that units deploy essentially with [only] their fighters and their critical support needs... we will aggressively reduce our logistics footprint and replenishment demand."

**General Eric K. Shinseki
October 1999**



Quotable Quotes



“The warfighter’s increased acceptance of field rations reflects the outstanding innovations and personal dedication of the individuals conducting and supporting the DoD Combat Feeding Program. The DoD Combat Feeding Science & Technology Program is excellent!”

Robert E. Foster

Director, BioSystems

Office of the Director of Defense Research and Engineering

16 July 1999



“The Natick Center (CFP) has become the nation’s preferred provider for science and technology.”

Charles E. Sizer

**Director, National Center for Food Safety & Technology,
Illinois Institute of Technology**

2 May 2000



CFP Concepts to Support the Objective Force

◆ **First Strike Ration**

◆ **Future Combat Vehicle Crew Sustainment**

◆ **Compressed Entrees**

◆ **General Purpose Ind/Group Combat Rations**

◆ **Biosensors**

◆ **Self Heating Rations**

◆ **Field-feeding and Advanced Sustainment Technology (FAST) Kitchen**

◆ **Advanced Design Refrigeration Systems**

◆ **Follow-On Concepts: TNDS & GSC**

**CREWL
STO/DTO**

**(Potential)
MEDICAL
STO**

**PROPOSED
STO**



First Strike Ration (FSR)

FSR-I

- ◆ 1st 72 Hours
- ◆ Eat-Out-Of-Hand
- ◆ Lightweight, Low Volume
- ◆ Modular
- ◆ Energy Rich

Concept
Evaluated
AWE-JRTC
(Aug 2000)



FSR-II

- ◆ Scenario Driven/ Tailorability
- ◆ Performance Enhancing
- ◆ Revolutionary/Active Pkg





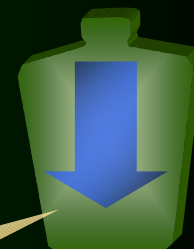
Compressed Entrees

- ◆ **Patented Technology (Air-drying, solute infusion)**
- ◆ **70% Reduction in Weight**
- ◆ **66% Reduction in Cube**
- ◆ **Rehydrates in hot water**
- ◆ **Over 20 prototype (recipes)**





Future Combat Vehicle Crew Sustainment (FCVCS)



FCVCS-I

- ◆ MWRH
- ◆ Capability to Heat MREs
- ◆ Hot Water for Beverages/
Limited Personal Hygiene

FCVCS-II

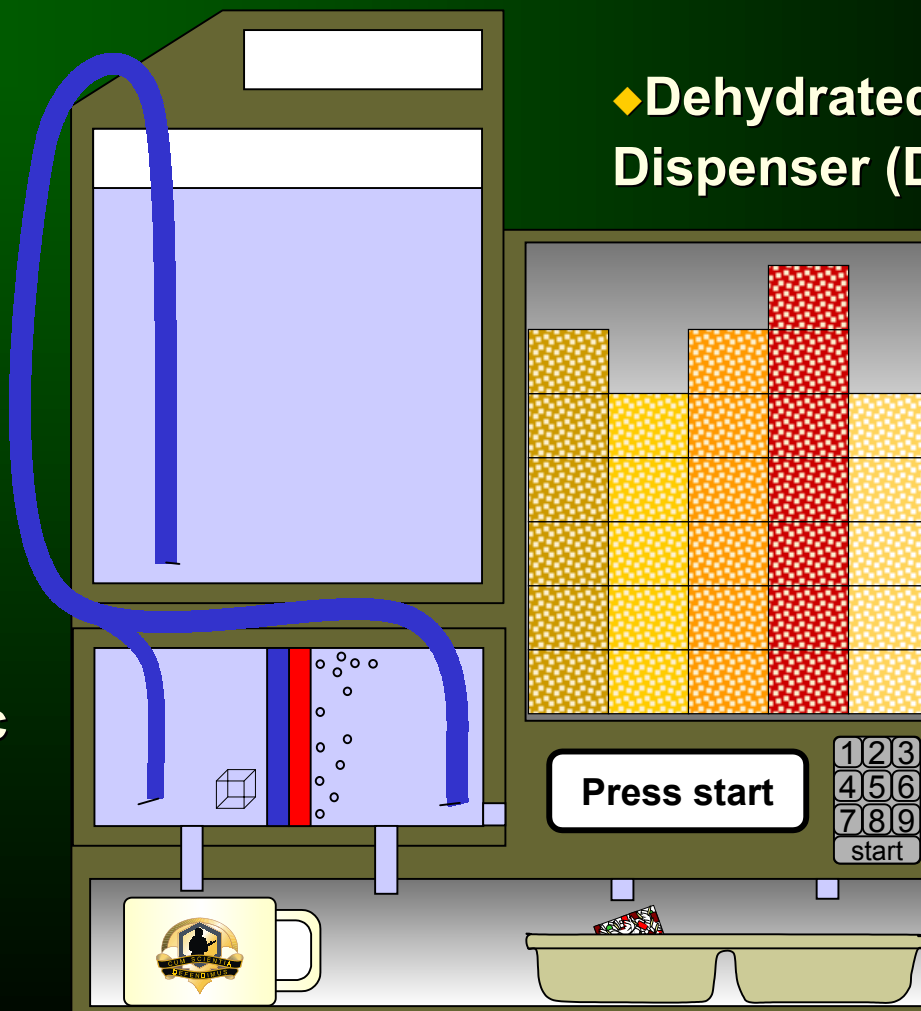
- ◆ Thermoelectric Device
- ◆ Heat/Chill Capability
- ◆ Reduced Weight/Cost
- ◆ Integrated Food Prep



FCV CS-II Concept: Mounted - Enhanced Sustainment System (MESS)

◆ 5 gallon water
can or water
recovered from
vehicle exhaust

◆ ThermoElectric
Chiller Heater
(TECH) section



◆ Dehydrated Ration
Dispenser (DR - D)



General Purpose Individual Combat Ration

- ◆ Future MRE
- ◆ Micronutrients/
Nutraaceuticals
- ◆ Revolutionary Processing/
Packaging
- ◆ Auto-ID / DYNUMO
- ◆ Project 30% Reduction
Battlefield Waste



PEF

HP

MW

Sterilization

**Irradiation
Sterilization**

**Dynamic
Pkg**

**Nano-
technology**

**Sensing/
Electronic Tagging**

M&S



General Purpose Group Combat Ration

- ◆ Future UGR (A, H&S)
- ◆ Extended Shelf Life (Minimal Refrigeration)
- ◆ Revolutionary Processing/ Packaging
- ◆ Auto-ID /DYNUMO
- ◆ Integrated with FAST-Kitchen/PSM



PEF

HP

MW

Sterilization

**Irradiation
Sterilization**

**Dynamic
Pkg**

**Nano-
technology**

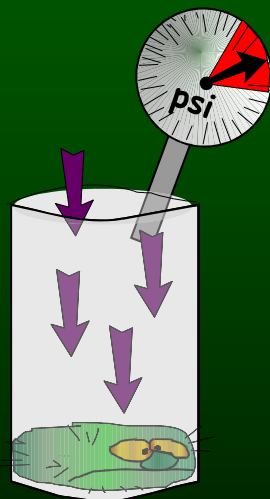
**Sensing/
Electronic Tagging**

M&S



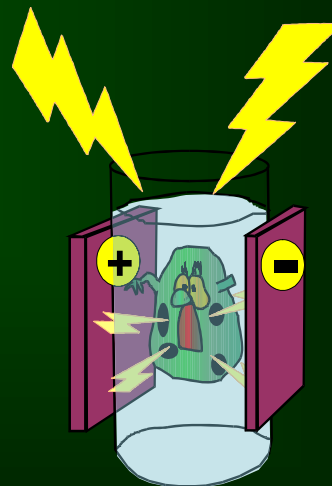
Dual Use Applications (Combat Rations)

High Pressure Processing

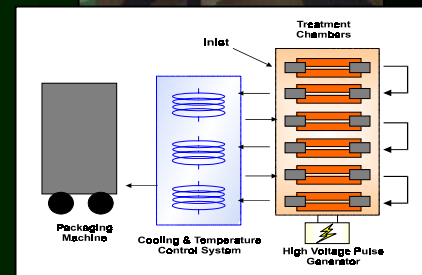


Rice
Fruit
Yogurt
Seafood Creole
Spaghetti/ Meat Sauce

Pulsed Electric Field Processing



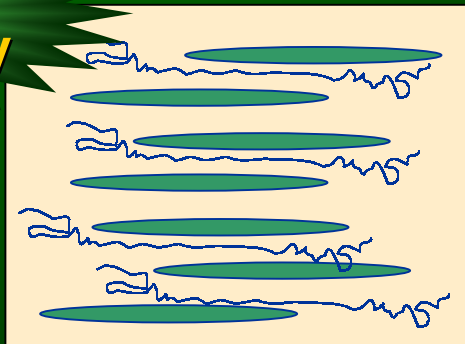
Salsa
Sauces
Yogurt
Orange Juice





Advanced Packaging Concepts

Nano-technology



Polychromatic Packaging



Dynamic Packaging

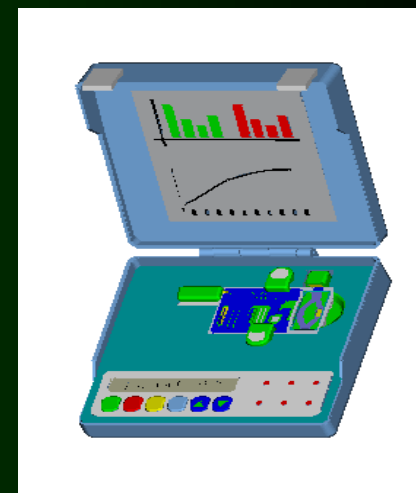




Biosensors

- ◆ Bioterrorism / Biological Warfare
- ◆ Advanced / Real Time, Rapid Detection
- ◆ Portable
- ◆ Results in 30 Minutes
- ◆ Integration into Future FAST-Kitchen

(Potential) Joint STO IVD4
*“Rapid Analysis of Food & Water for
Chemical & Microbial Contaminants”*

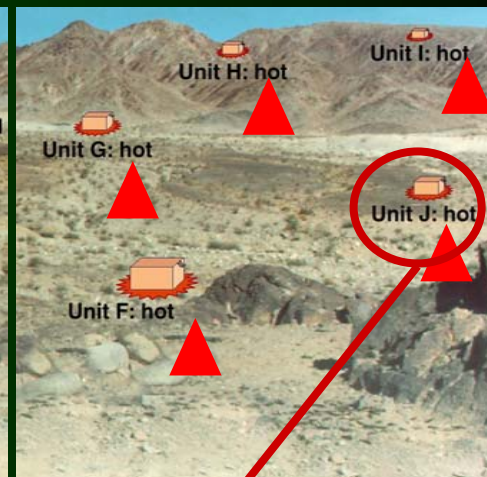
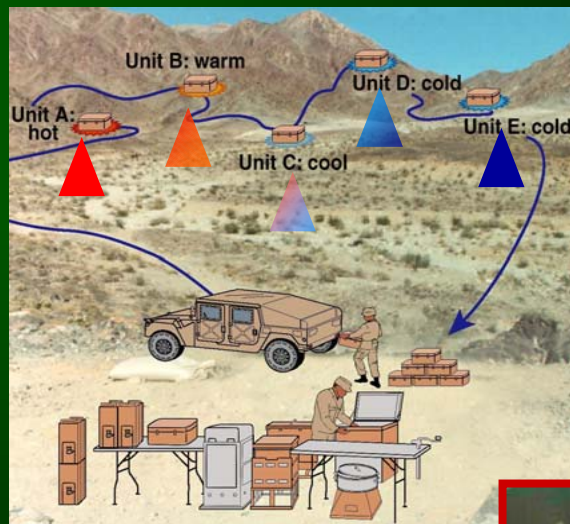




Remote Unit Self Heating Rations

- ◆ Heat & Serve
- ◆ Compact
- ◆ Self-Contained
- ◆ Water Activated
- ◆ Electrochemical Heating/Cooling

CREWL STO



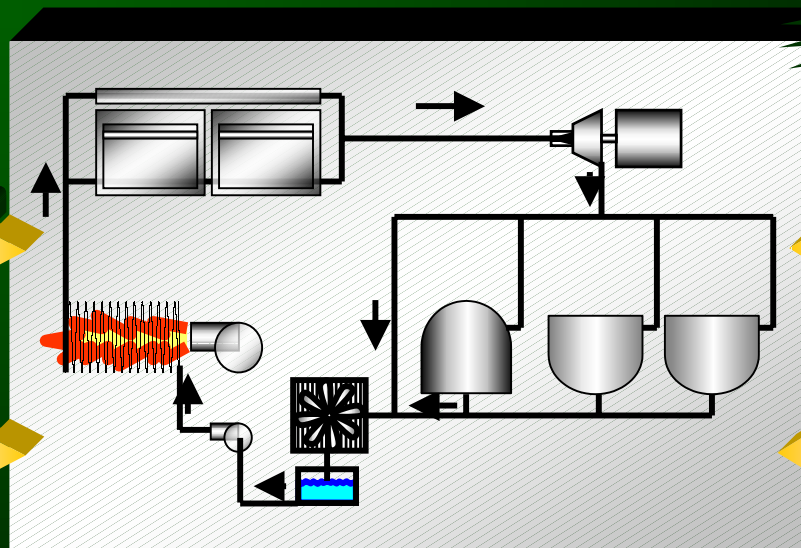


Field-feeding and Advanced Sustainment Technology (FAST) Kitchen

PROPOSED STO
Submitted Feb 01
Endorsed by SSC

SLIC

Advanced Sanitation



1st Generation

- ◆ Trailer/HMMWV Mounted
- ◆ One Commercial Burner
- ◆ Reduced Fuel Consumption
- ◆ Increased Reliability

2nd Generation

- ◆ Planned Tech. Insertion
- ◆ Integrated/Tailorable Novel Ration System/PSM
- ◆ Nutritional/Hydration Sensor



Advanced Design Refrigeration (ADR)

- ◆ **ADR 300**
- ◆ **Vacuum Insulation Technology**
- ◆ **463L Pallet System**
- ◆ **Replaces 150 cu ft container**
- ◆ **Increase capacity 100%**
- ◆ **Reduced transportation footprint 50%**

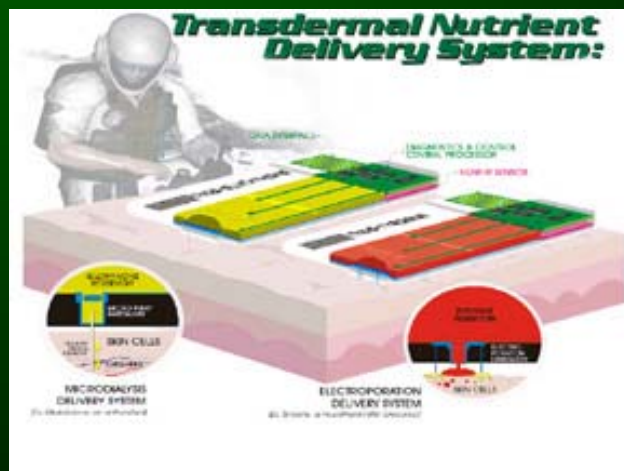




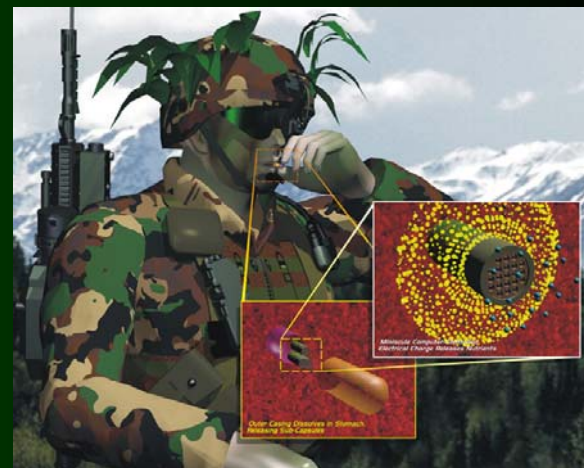
Future Feeding Systems and Beyond JV 2020



“Biodigester”



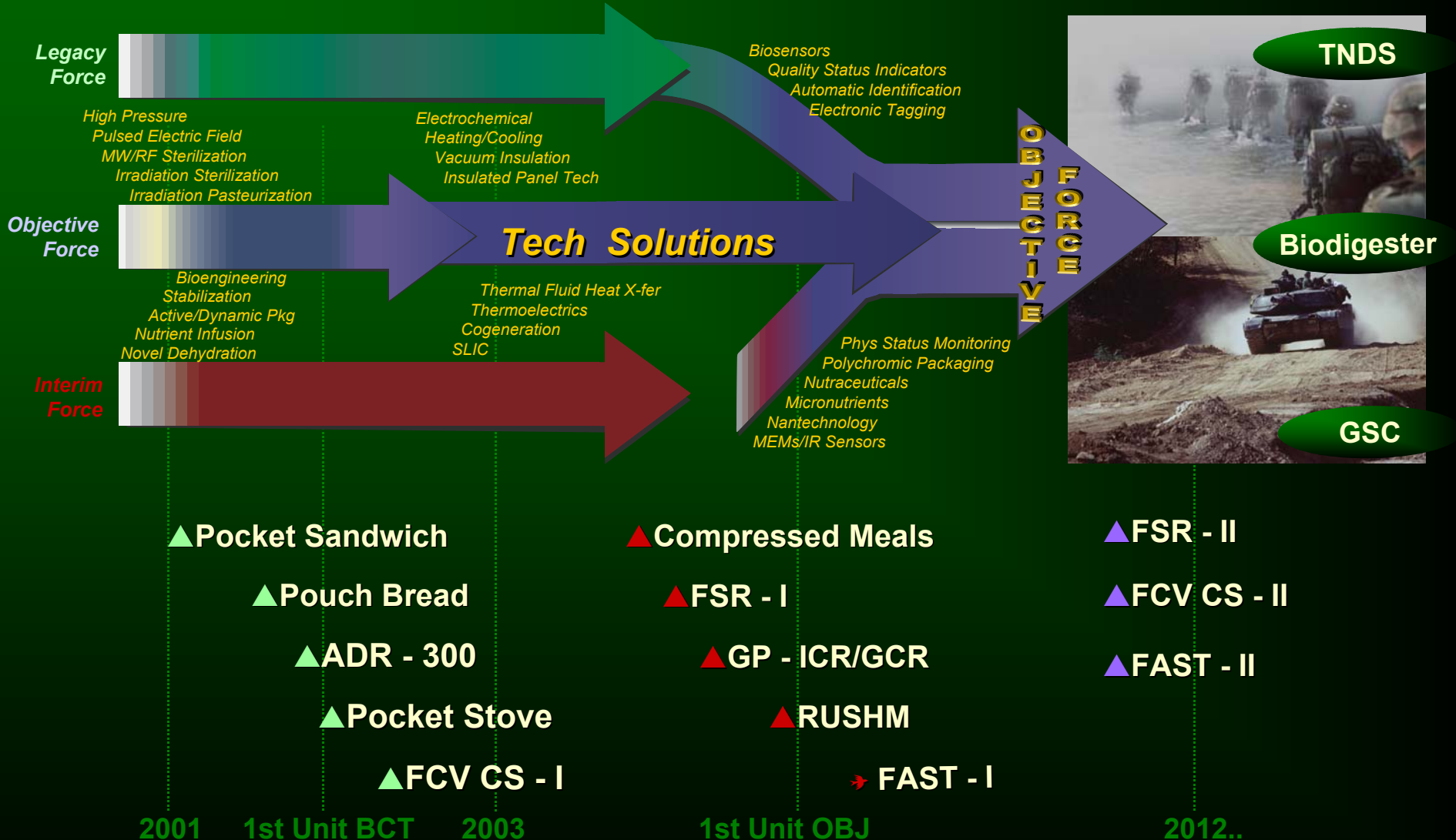
Transdermal Nutrient Delivery System



“Grocery Store on a Chip”



Combat Feeding Technology Integration





Quotable Quotes



"The Combat Feeding technologies for the Objective Force, like the Compressed Entree, are right on target."



**General John W. Hendrix
Commanding General
U.S. Army Forces Command
27 September 2000**

The DoD Combat Feeding Program

Meeting Today's Challenges



Providing Tomorrow's Solutions